Vol 2211 A

No. 9469

United States Vol 22.11

Circuit Court of Appeals

For the Ninth Circuit.

UNITED STATES OF AMERICA,

Appellant,

vs.

ARMATURE EXCHANGE INC., a corporation, also known as The Armature Exchange, a corporation, also known as The Armature Exchange, Inc., a corporation,

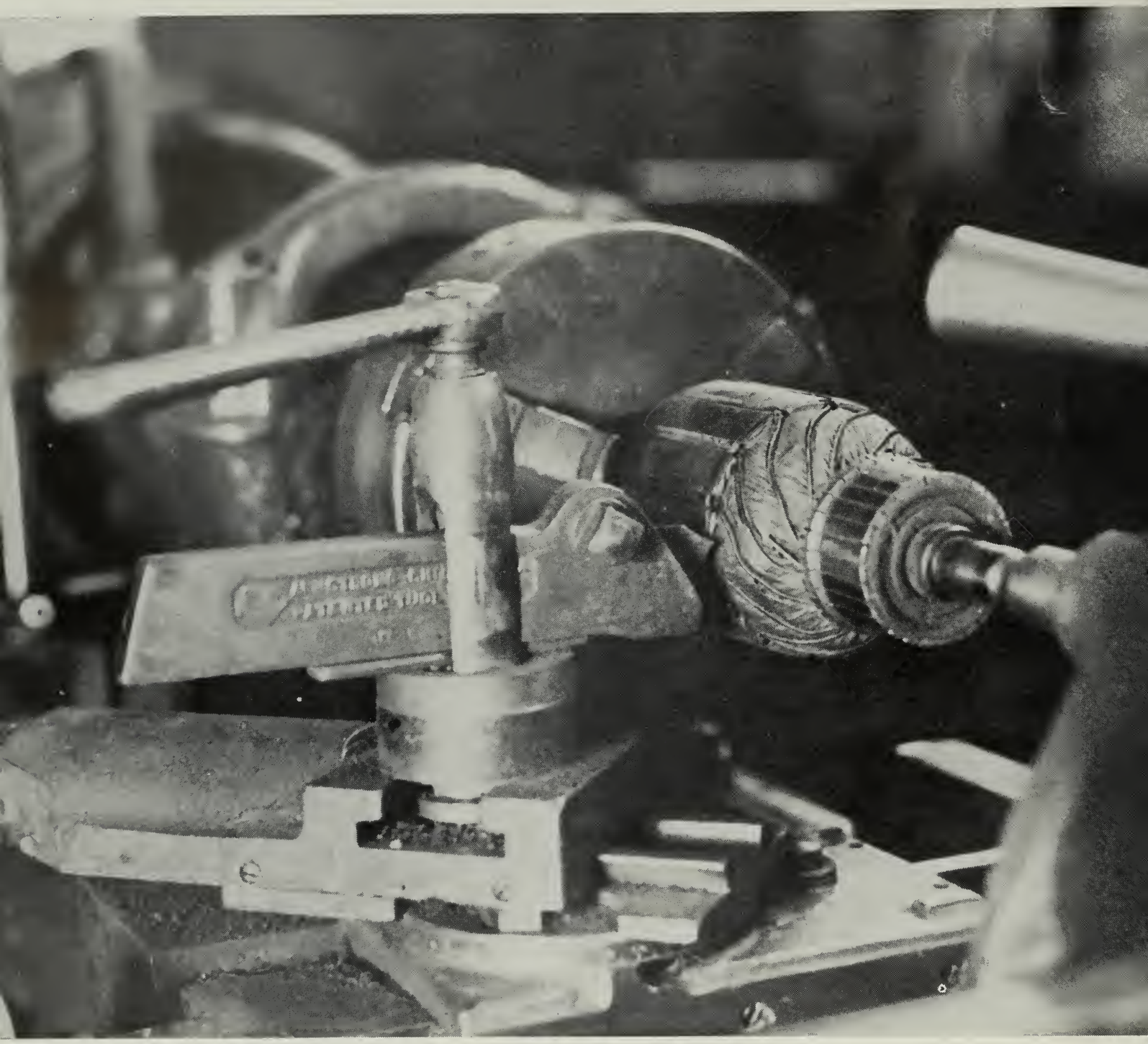
Appellee.

Transcript of Record

(JOINT EXHIBIT No. 1)

Upon Appeal from the District Court of the United States for the Southern District of California, Central Division

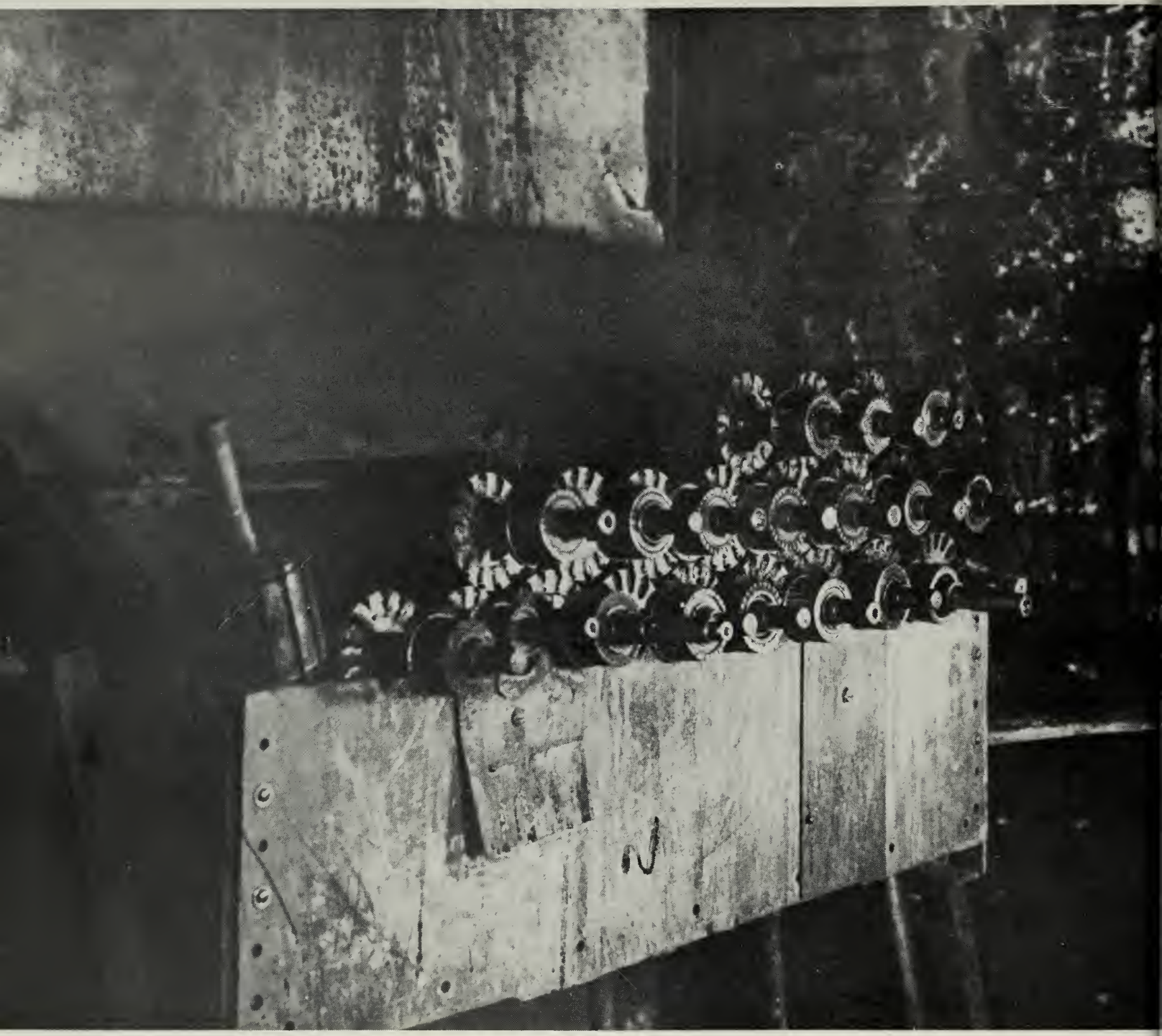
PARKER PRINTING COMPANY, 545 SANSOME STREET, SAN FRANCISCO 60-5-23-46



(1)

The armatures are placed in a lathe and the wires leading from the core to the commutator are cut out with a knife as the lathe revolves.

(See No. 1 of Deft's. Ex. "C": an armature prior to above operation.)

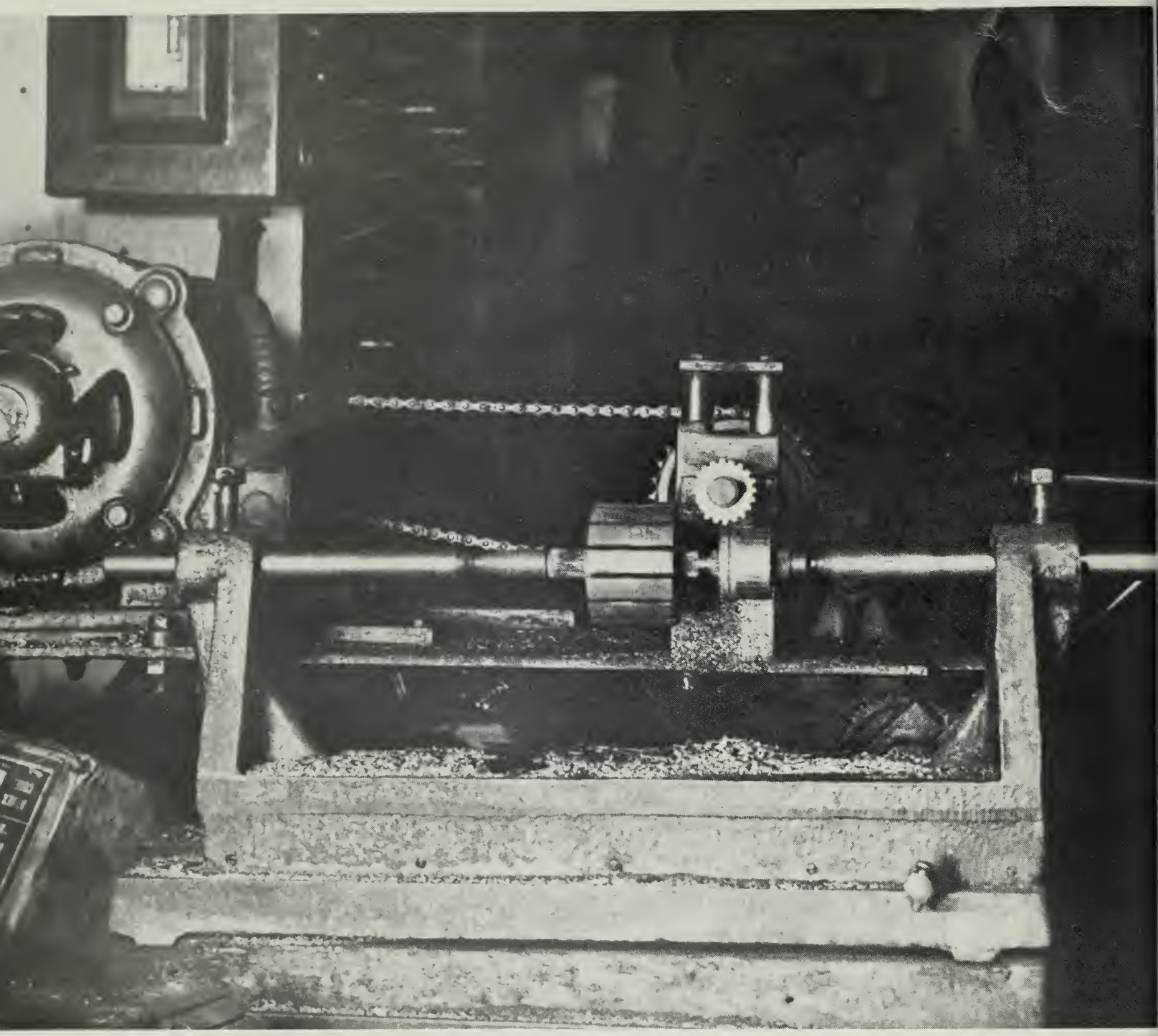


(2)

The cores are then heated over a gas flame for about 20 minutes (the flames coming up from a range within the metal box above). The purpose of the heating is to loosen the old wires and old insulation so that they may be easily removed.

After the armatures are laid out on a metal top table and slightly cooled, they are placed in a V-shaped slot, and a steel chisel is driven down between the mass of old wires which have been loosened by heating, and the old wires are pried out.

(See No. 2 of Deft's. Ex. "C": an armature prior to above operation.)



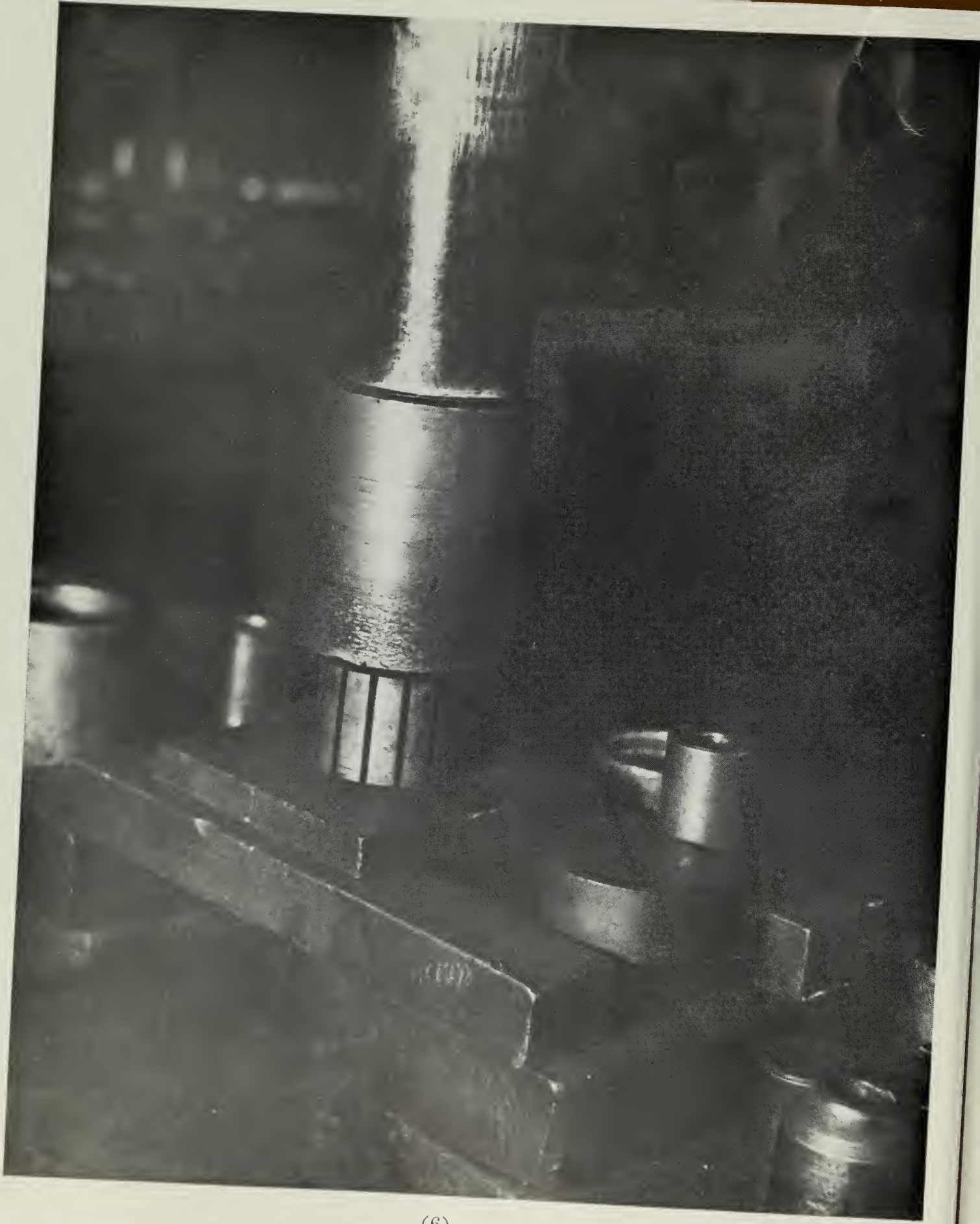
(4)

The armatures are then placed in a machine equipped with a small saw that reslots each commutator bar at the place where the old wires were soldered in (i. e. at the end of the commutator closest to the core). This machine operates by suspending the shaft on which the core and commutator are mounted between a clamp, and the saw-blade about one and one-half inches in diameter is moved up to each slot by means of a lever, and the shaft is rotated by hand. Any solder remaining in the slots is removed with a small metal pick.

(See No. 3 of Deft's. Ex. "C": an armature after above operation.)

(5)

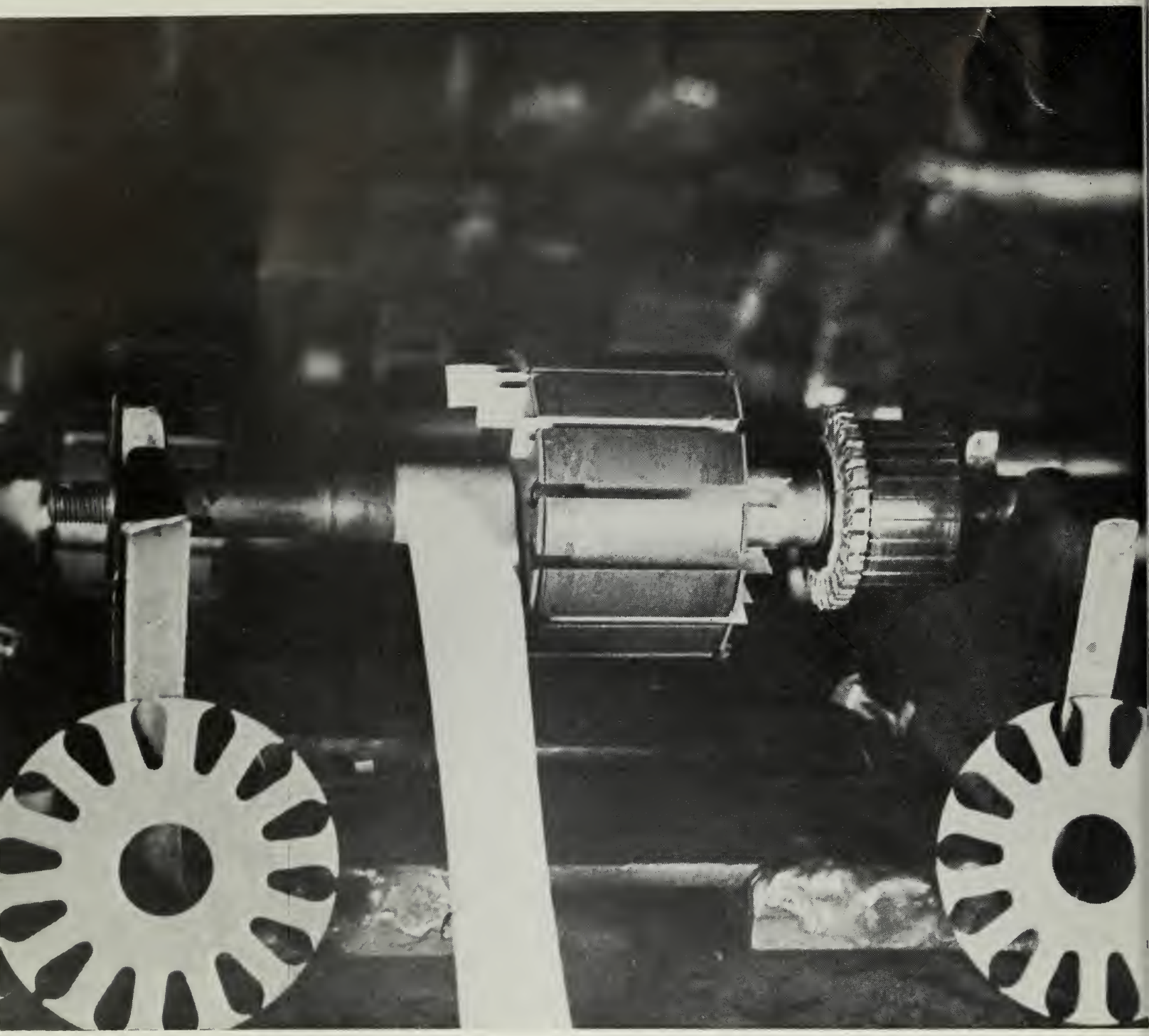
The placement of the commutator on the shaft is checked with a pair of calipers by measuring from the point on the shaft where the bearing rides to the front end of the commutators, as shown above. The distance from the core to the commutator is measured with a metal rule.



Any errors in the mounting of the core or commutator on the shaft are corrected by means of adjusting their respective placements by means of an arbor press. The laminations of almost every core are pressured together on this same press before any further steps are taken. This latter operation (illustrated above) is done to realign any laminations which may have become somewhat separated.

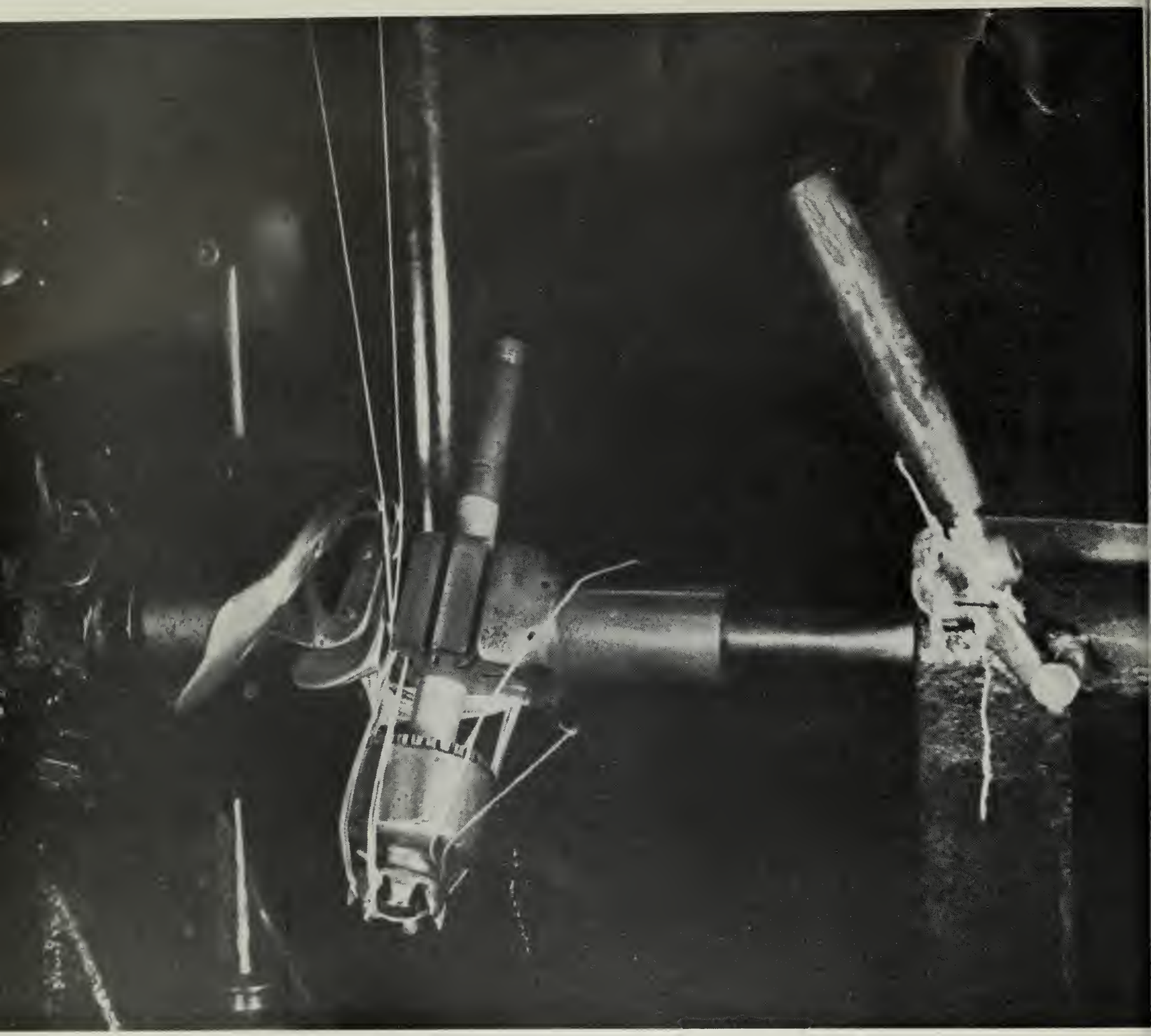
(7)

A test is given to insure that none of the bars on the commutator are grounded to the shaft, or shorted. This is done by rotating the end of a live wire over the commutator, and at the same time having the shaft grounded.

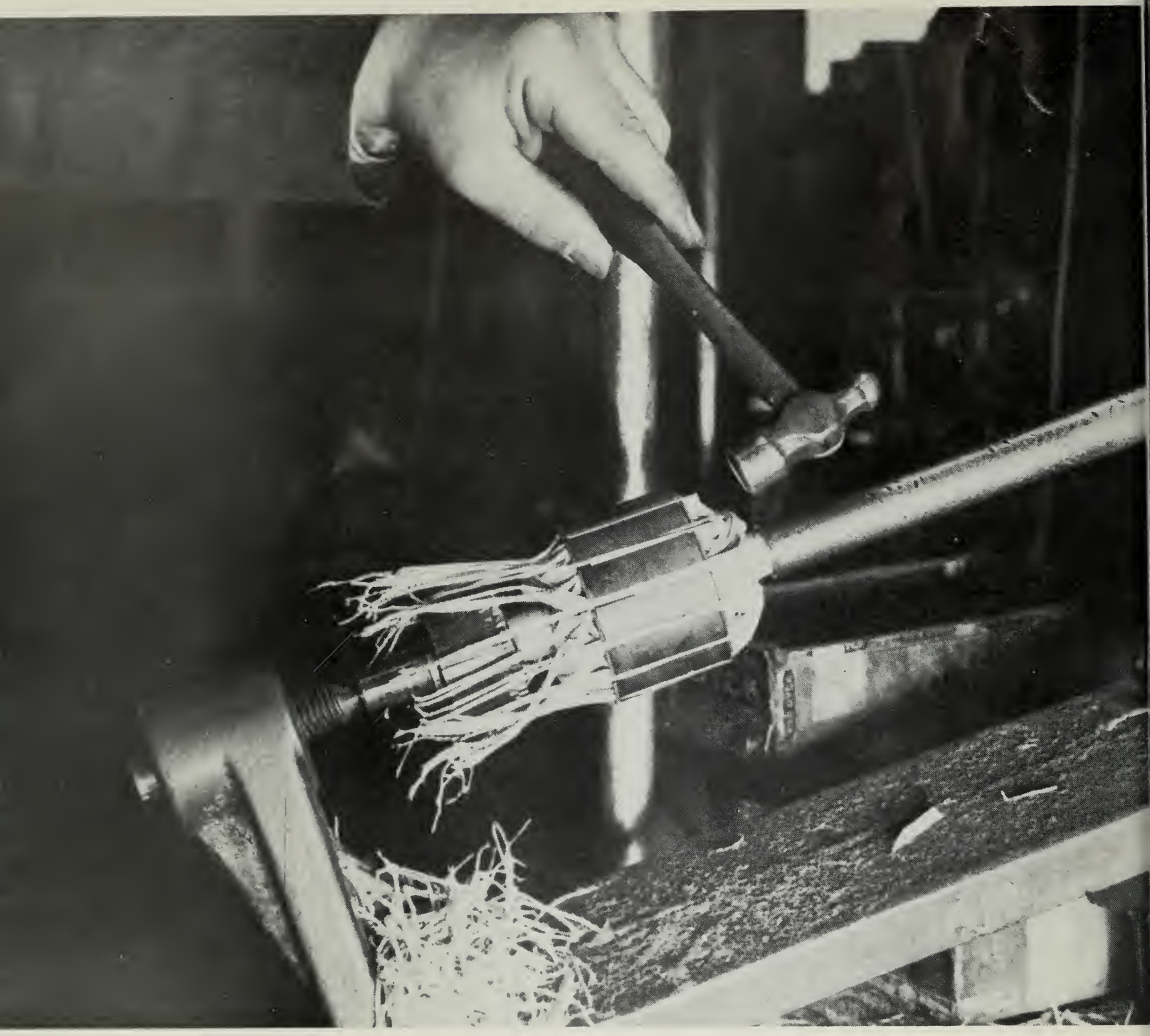


Then each portion of the shaft leading from each side of the core is insulated by approximately five wrappings of paper around the shaft as it protrudes from each end of the core. The insulation is about an inch or so in length. Each slot in the core is also insulated by placing therein a folded insulating paper approximately the size of a cigarette paper; and each surface end of the core is insulated with a heavy pressed cardboard which has been stamp-cut the shape of the surface ending of the core (this latter type of insulation is pictured at the lower right and left of the above illustration). All three types of insulation are shown above.

(See No. 4 of Deft's. Ex. "C": an armature after above operation.)



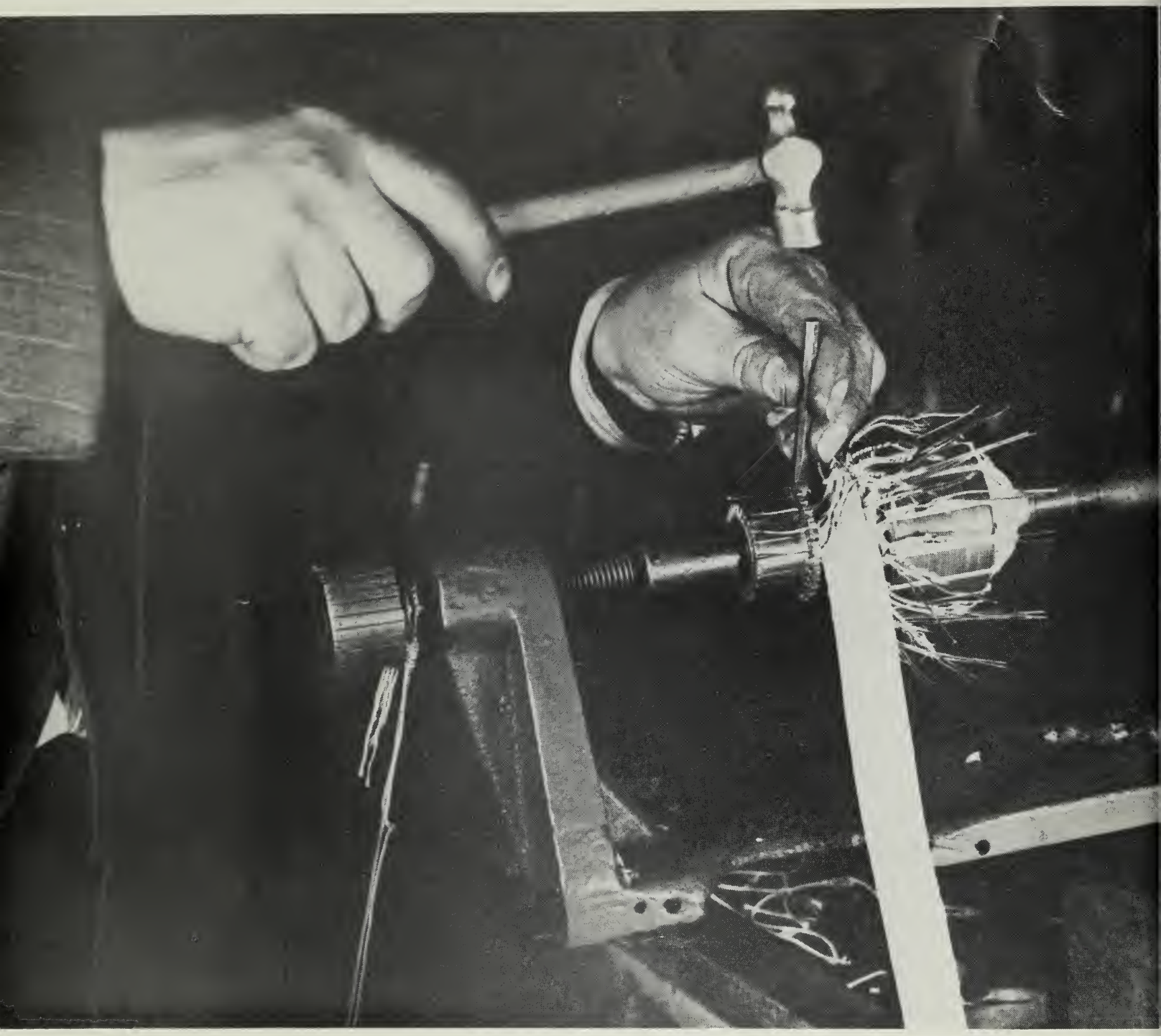
Approximately 95% of the armatures are rewound on a Chapman winder shown above. This machine is designed to rewind armatures with fourteen-slot cores. Those which have a different number of slots must be rewound by hand. This machine has a lathe, in which are two jaws that hold the laminated core in such a manner that the shaft extends perpendicularly from the axis of the lathe an equal distance in each direction. Two strands of wire lead from two different reels up through the top of the machine, over pulleys and down to the armature in the jaws of the lathe. Two sizes of wire (Nos. 16 and 17) are used in the winding, depending upon the electrical output expected out of the generator; i. e. a heavier wire can give a greater output. Each coil is wound with six complete turns. On each turn, the wire in the slot on one side of the core leads into the slot on the direct opposite side of the core. There are two coils in each slot, making, therefore, in the case of a fourteen-slot core, twenty-eight coils. Upon the completion of each coil, that is, after six turns, the wire is laid up over the commutator-end of the shaft as shown above, and, at the conclusion of the next coil following, that particular wire is cut near the commutator-end of the shaft and the lead end of the wire folded back. However, the lead ends on the top coils of the half of the core that is lastly wound are not cut by the winder operator, because there is no necessity of cutting them, but are left suspended in a loop over the commutator end of the shaft. The only reason for cutting the other wires is because they are from coils that are underneath and, if they were not cut, the wire from the top coil would bind them down to the shaft.



(10)

The armature is then placed in a lathe-like clamp, called a bench center, which clamp suspends the armature by holding it at each end of the shaft. Then all of the wires which were not previously cut by the operator on the winding machine are cut, and this leaves fifty-six leads, with two leads to each coil, and two coils to each slot. Wooden wedges are then driven over the top of the wires and into each slot of the laminated core, as illustrated above. This is for the purpose of holding the wires in the slots.

(See No. 5 of Deft's. Ex. "C": an armature after above operation.)

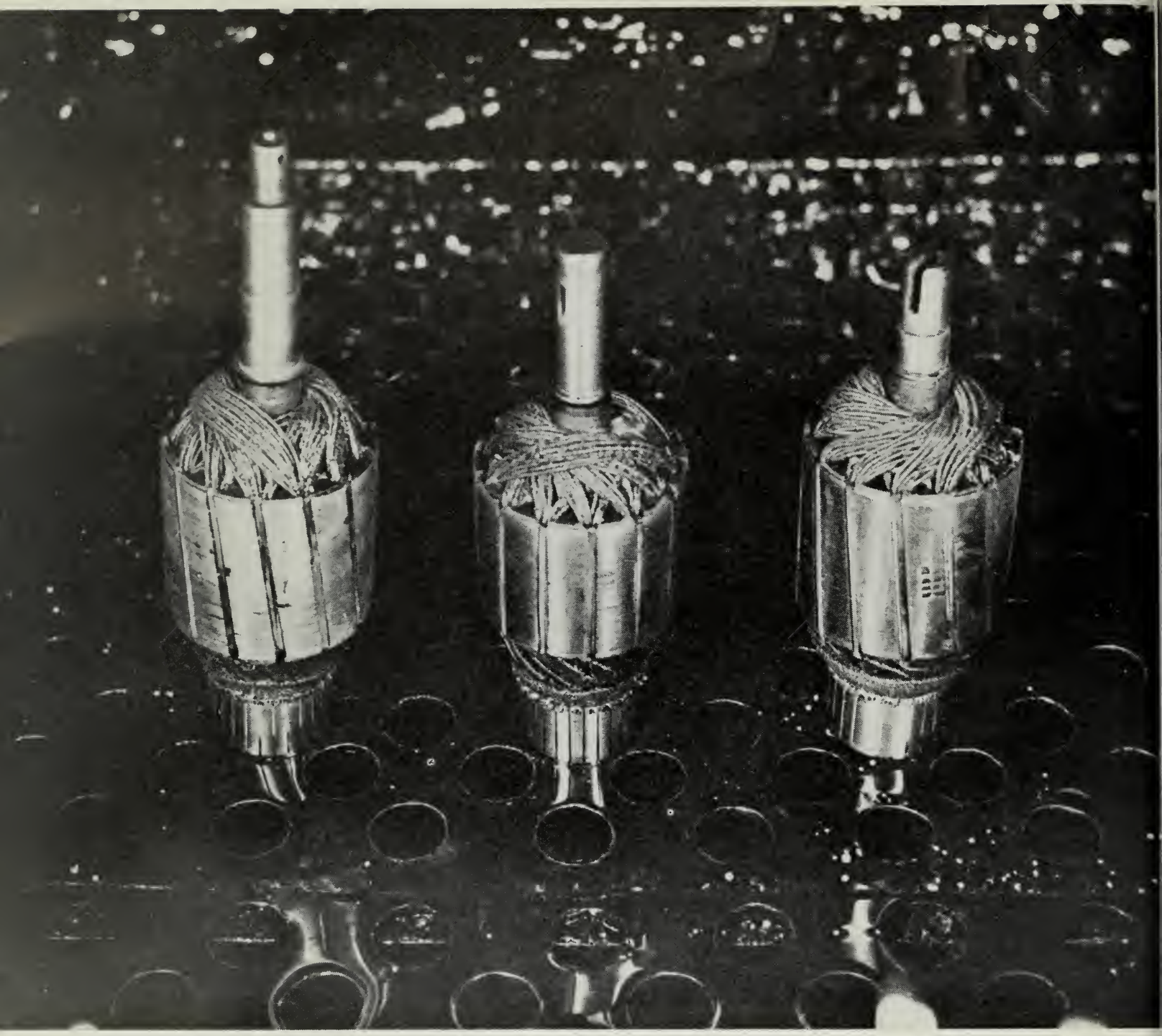


(11)

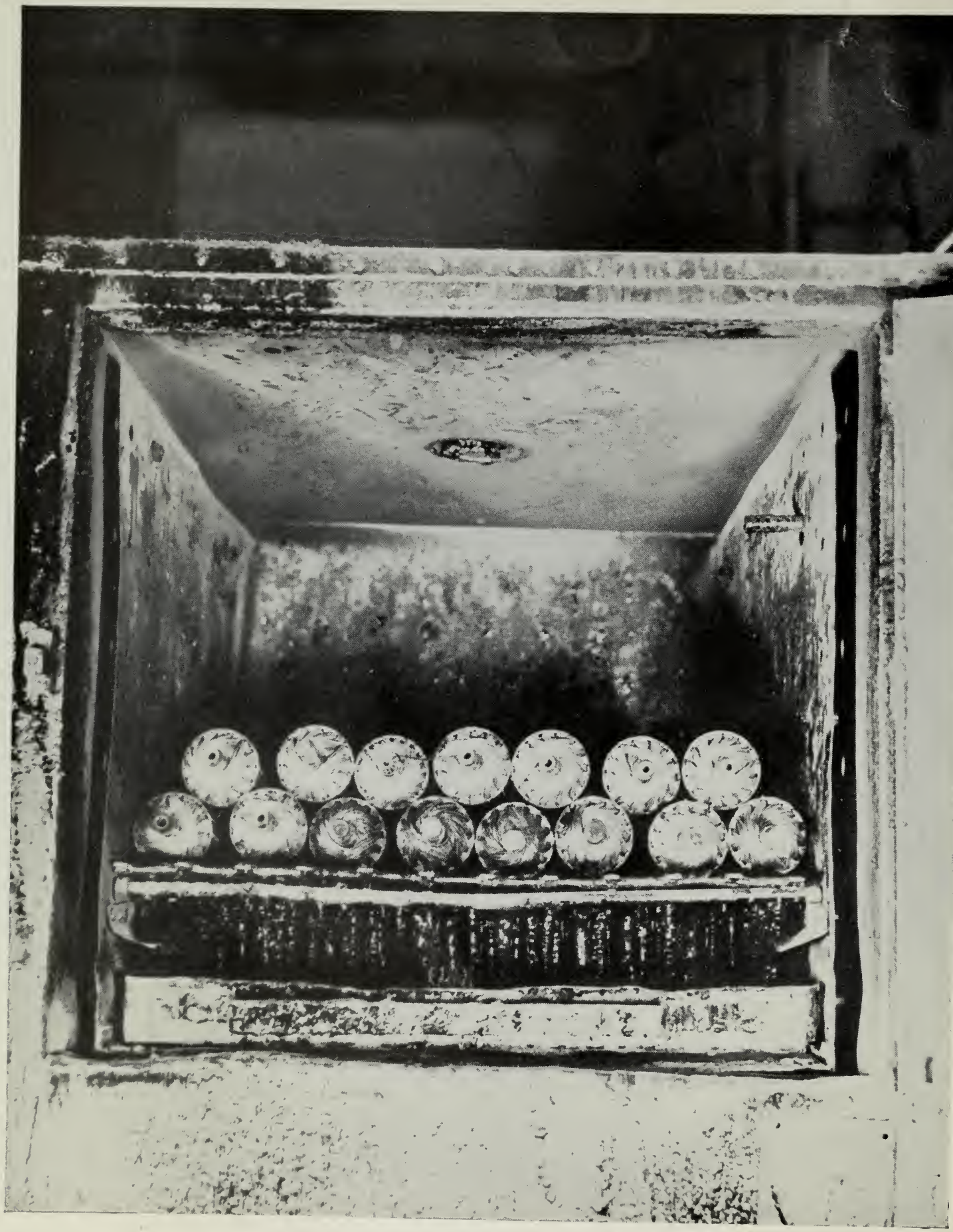
The leads are pulled down in three equal groups and the ends of the leads inserted into an electrically driven machine with two wire rollers operating in opposite directions, which cleans all of the insulation from the leads for a distance of about two inches from the ends of the leads. These leads extend approximately four inches out of the slots of the core.

The leads from the top coils are folded back over the core, and then the leads from the bottom coils are similarly folded back. This is only for the purpose of making them easily available to the operator when he is connecting them with the commutator. There are four sets of leads, corresponding with the sets of coils in the armature. These leads are inserted firmly in place by means of a small chisel. As the leads are connected, the operator rotates the armature. A connection of a set of leads is completed with each rotation. As each complete rotation is made, the wires which now lead from the core to the commutator are insulated by wrapping with insulating paper approximately one and one-half inches in width. Since there are four complete sets of leads, this makes three sets of insulation, the top leads being exposed. Twine is then wrapped around just behind the commutator with about seven turns so in the event the soldering holding the leads into the commutator becomes hot, the cord will still keep the leads in place.

Solder flux is painted around the commutator where the wires have been tapped into the slots. The whole commutator is then immersed into solder, as shown above, the solder only adhering to the band where the flux has been applied.



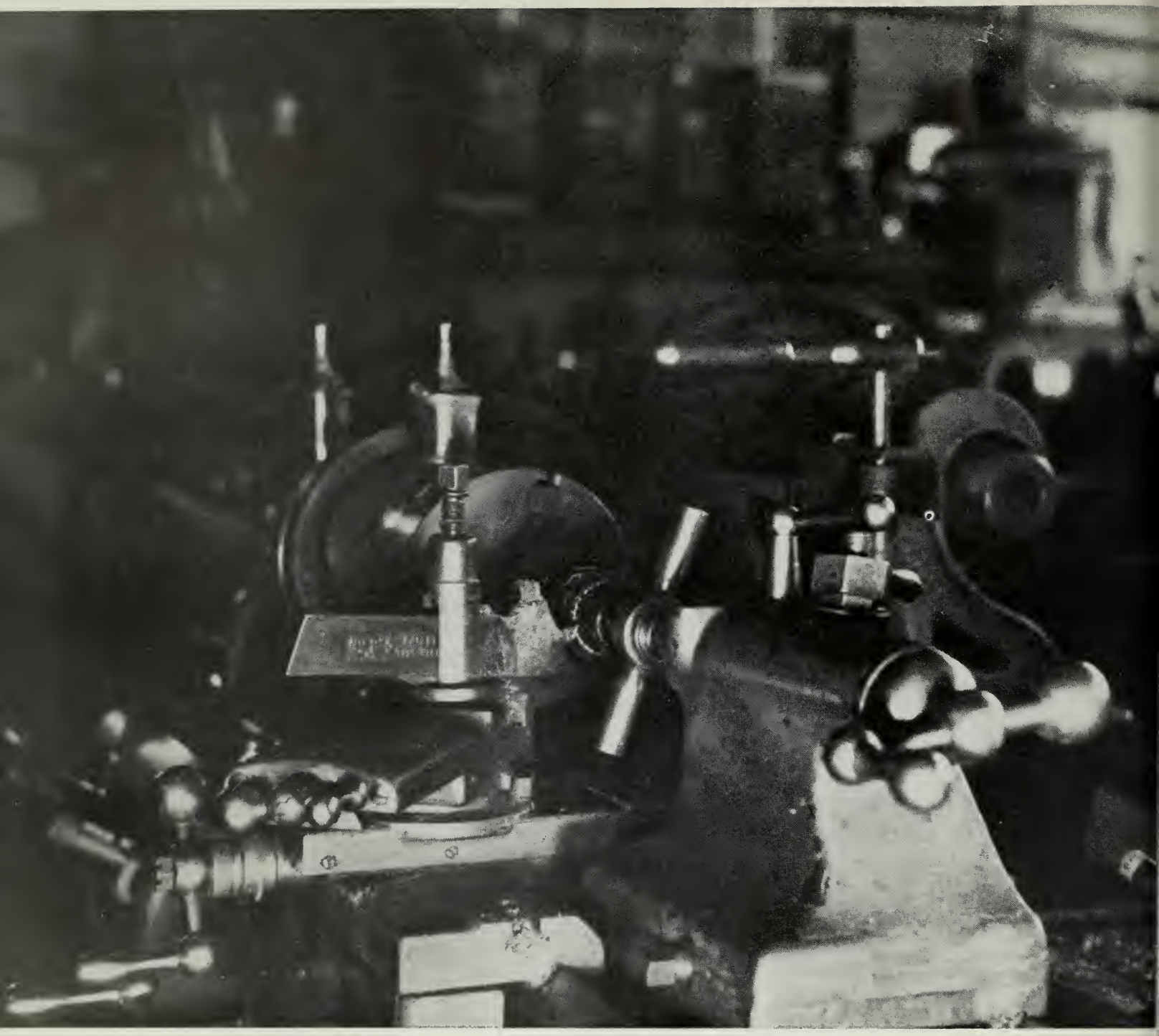
The armatures are then placed on end into a tray (illustrated above) and the tray is lowered into an insulating varnish, where it remains for about fifteen or twenty minutes, so that the cotton insulation of the wire will be completely saturated. The tray is then raised, and the armatures drained for approximately thirty minutes.



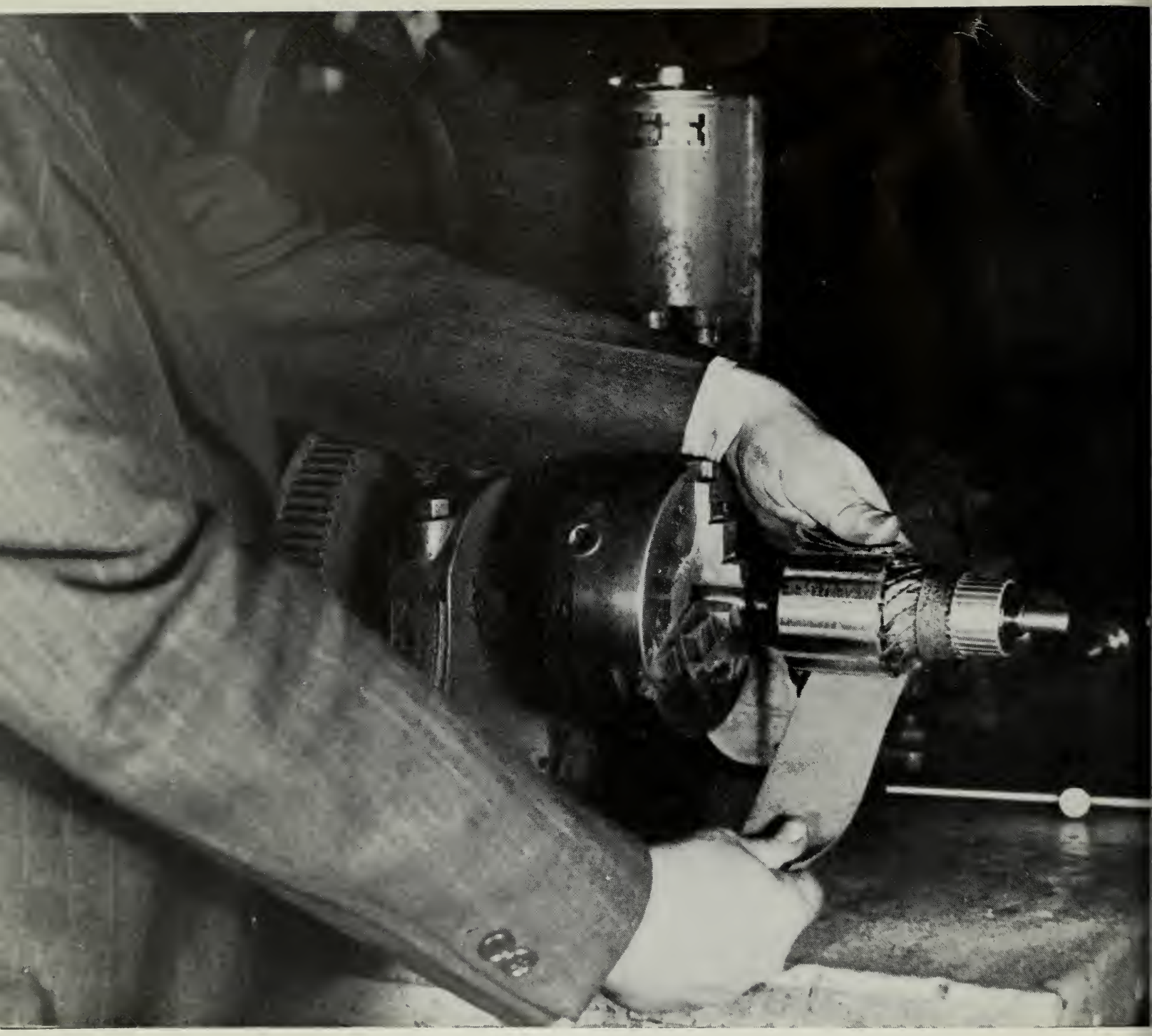
The armatures are placed in an electric oven, as shown above, and baked overnight at a temperature of about two hundred and fifty degrees.

Note: The total day's production is generally dipped and baked at one time.

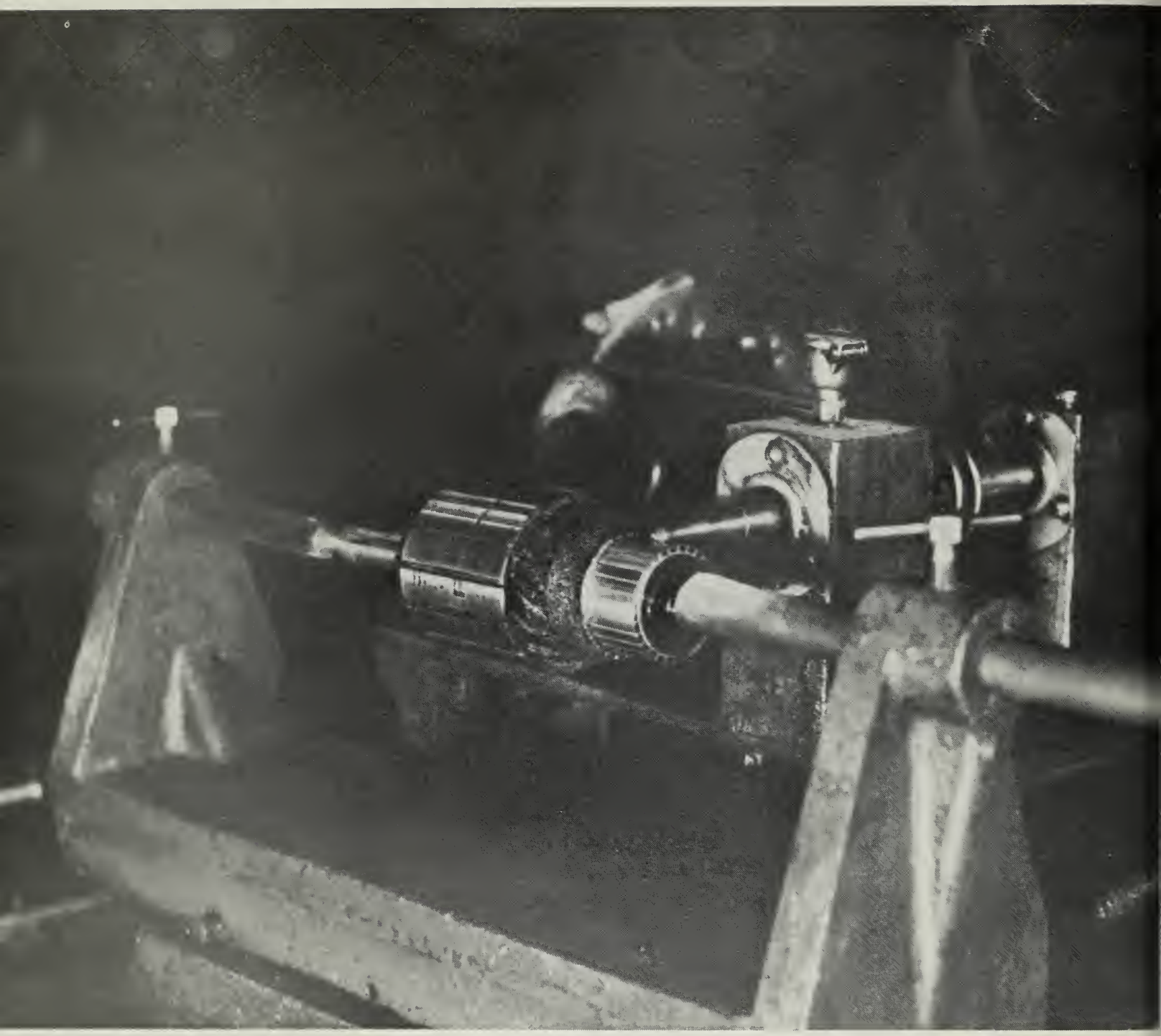
(See No. 6 of Deft's. Ex. "C": an armature after above operation.)



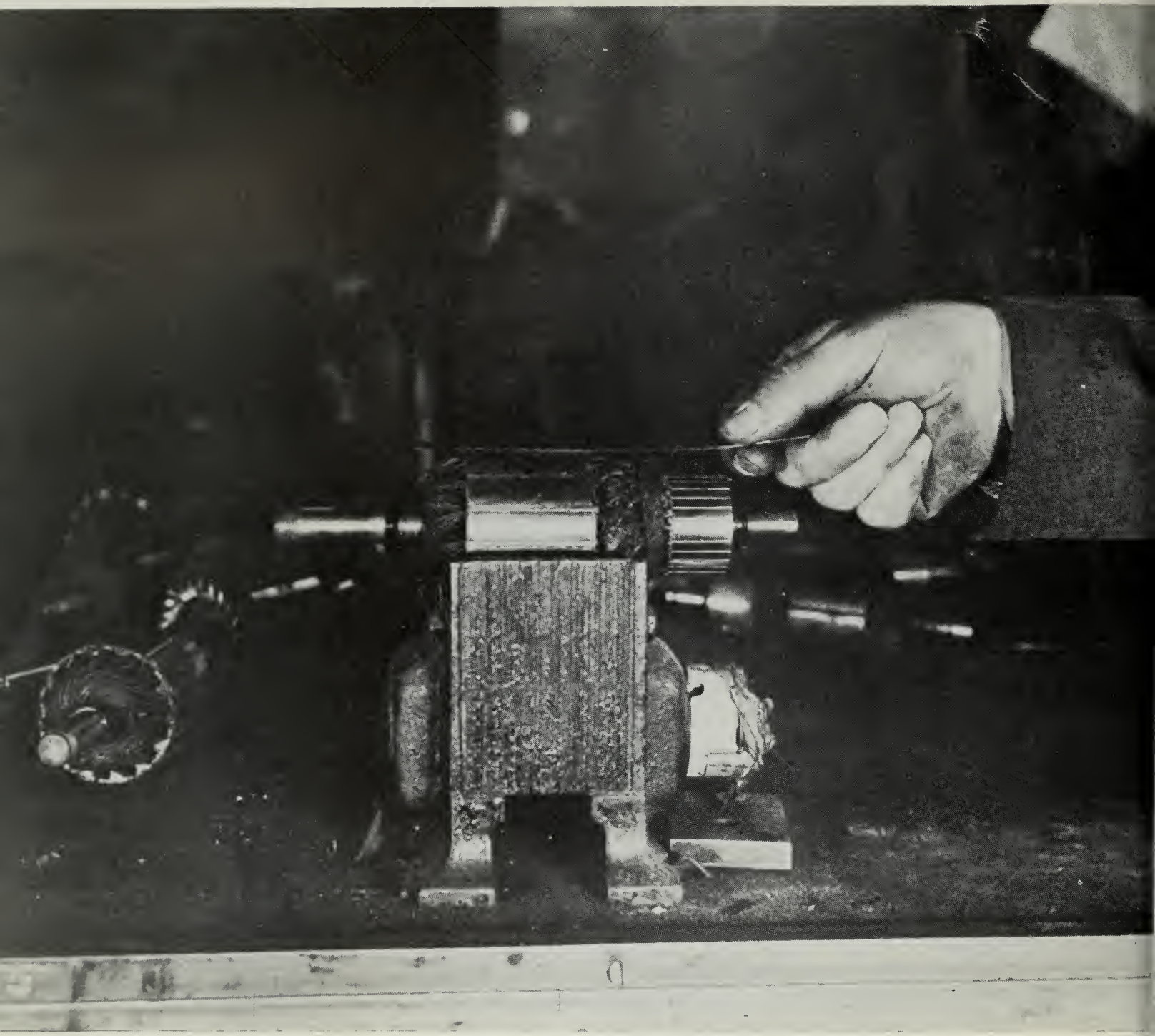
The armature is taken from the oven and placed in a lathe where the commutator is planed down sufficiently to true the brush surface of the commutator.



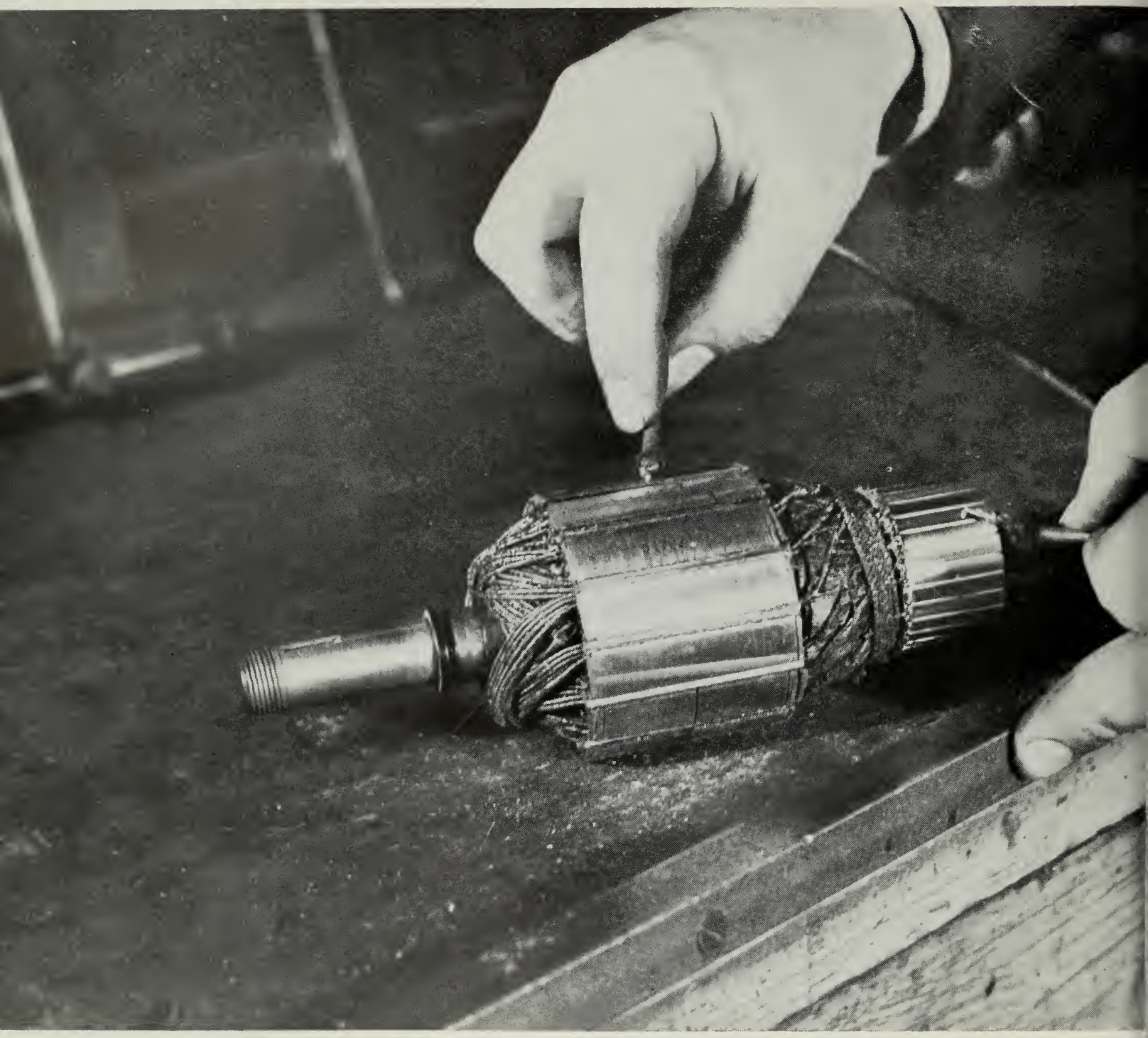
The end of the shaft of the armature is placed into a chuck and is rotated, and by applying an abrasive cloth, as shown above, to the surface of the laminated core, the shaft and the commutator, the same are polished, and all the excess varnish is removed from the metal.



The armature is then placed between centers and a small saw blade, approximately one-quarter inch in diameter, cuts the level of the mica insulation between the commutator bars to a level below that of the surface of the bars of the commutator.

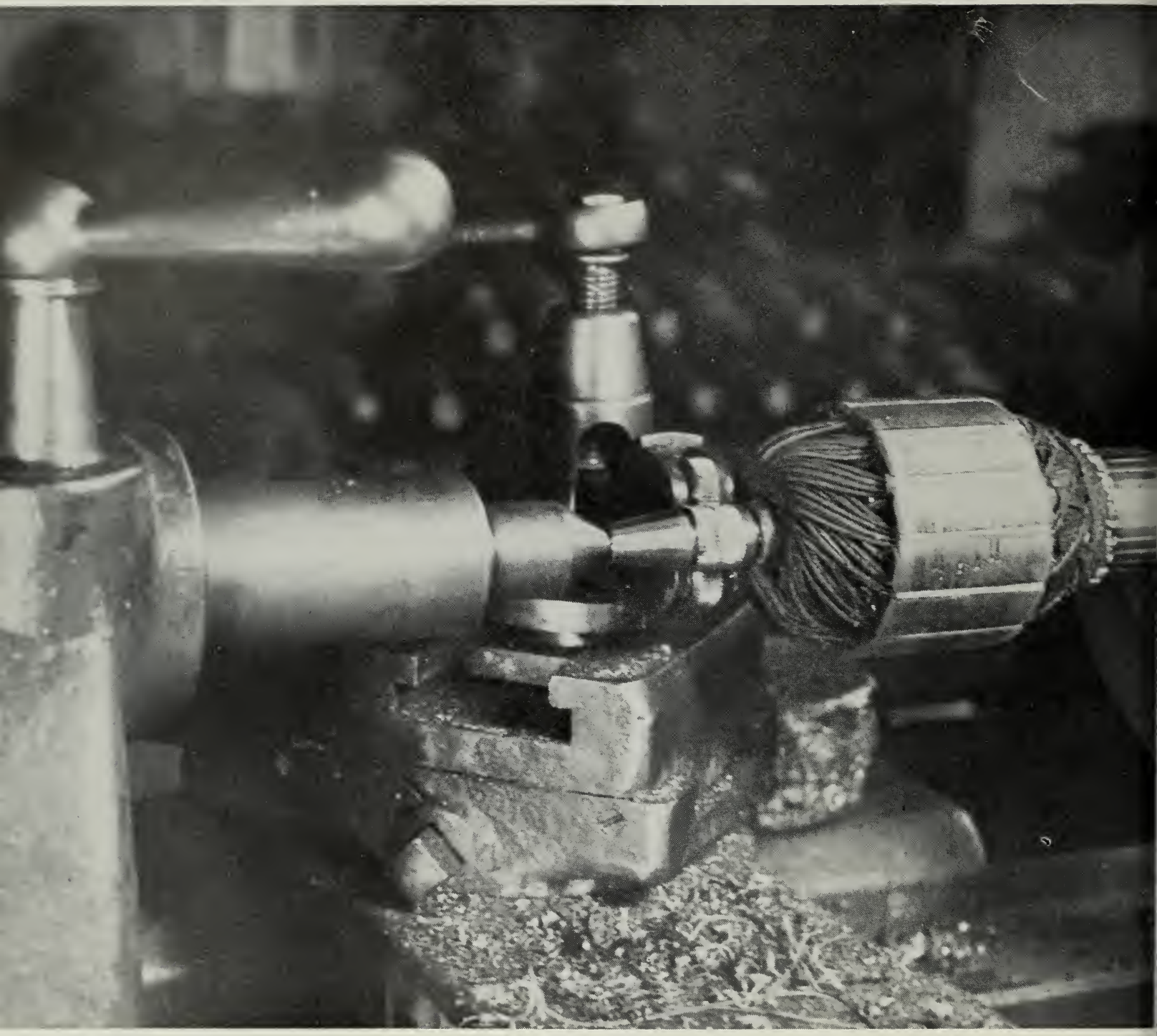


The armature is tested for shorts. This is done by placing the armature onto a magnetic growler (that is, by setting the core part on the magnet) and if there is a short in the armature, a thin metal blade will be attracted to the core, as shown above.

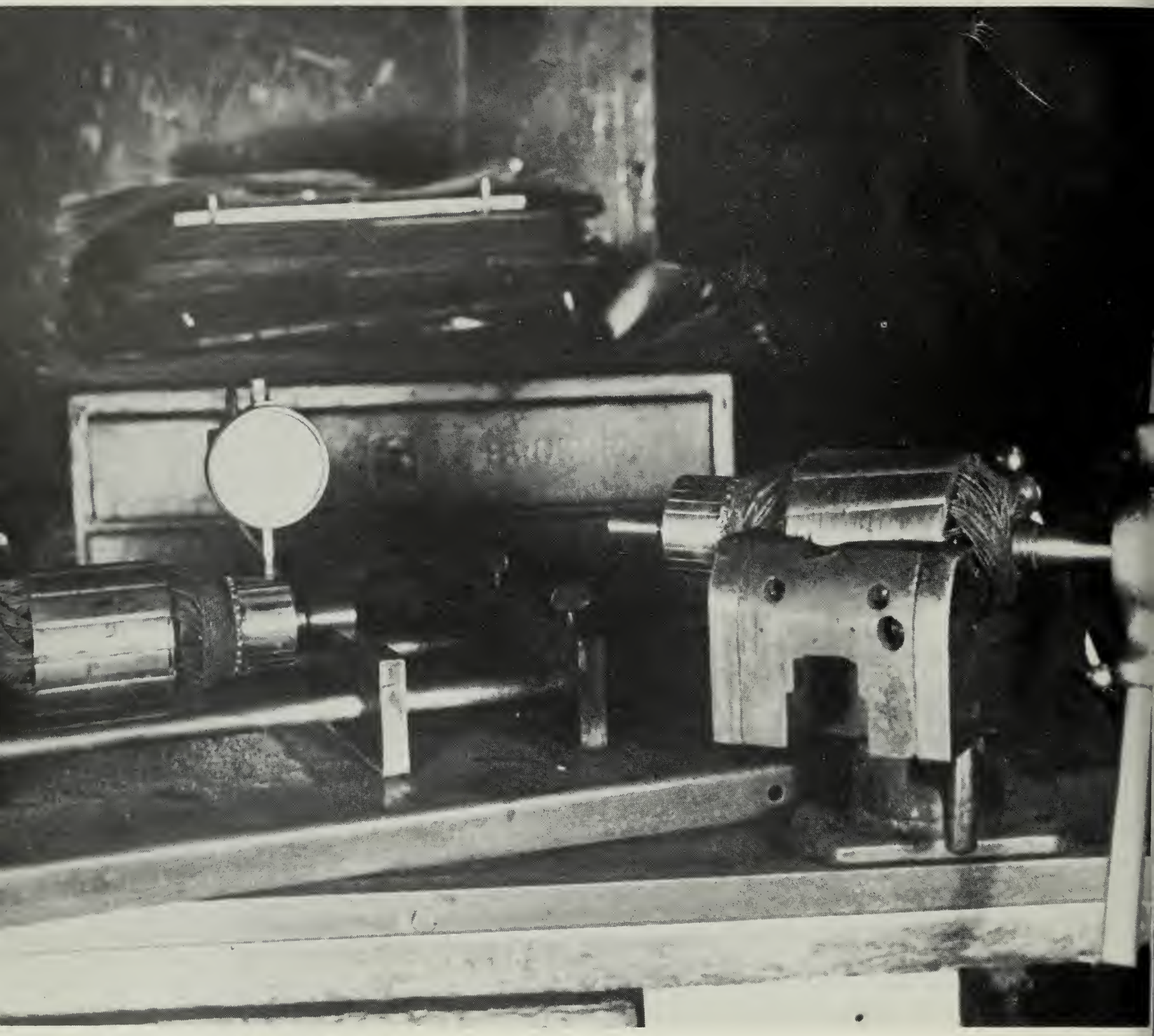


(19)

The armature is tested to see if it is grounded by touching one wire to the shaft and the other to the commutator, and if it is grounded, the connection is made and a light attachment is illuminated.



The shafts are then checked for undersize with a micrometer. If the shaft is too far undersize, it has to be knurled or sleeved. The process of knurling is illustrated above. The shaft is roughened so that it will fit snugly with a bearing. If the shaft is too small to be knurled, it must be turned down on a lathe and a metal sleeve driven over it. About fifty percent of the shafts must be knurled, and about fifteen percent must be sleeved.



The armatures are then finally checked by rotating the commutators under a micrometer. This is done for the purpose of insuring that every bar of the commutator is of approximately the same height, otherwise proper contact with the generator brushes will not be made. This test is illustrated on the left side of the above picture.

The ends of the shafts are then rethreaded (upper right) and the armatures *and* ready for boxing.

(See No. 7 of Deft's. Ex. "C": a completed rewound armature of the Plt'f. Company.)

[Endorsed]: No. 8437Y Civ. Joint Exhibit No. 1. Filed 5 23, 1939. R. S. Zimmerman, Clerk. By L. J. Somers, Deputy Clerk.

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